

What is claimed is:

1. A toner cartridge comprising:

a developer storage container for storing a developer;  
a rotary conveyance body, installed in said developer storage container, for carrying the developer in the developer storage container toward an exhaust port; and  
detection windows through which a light beam projected from a developer detector is input and output to detect the remaining state of the developer in the toner cartridge when the toner cartridge is mounted to a developing unit, wherein said detection windows are arranged at positions where the optical axis of the input and output light beam intersects the rotary shaft of said rotary conveyance body obliquely on a projection plane when seen from the top or side of the toner cartridge.

2. The toner cartridge according to claim 1, wherein said detection windows are arranged such that the optical axis of the input and output light beam becomes parallel to a direction that said rotary conveyance body carries the developer.

3. The toner cartridge according to claim 1 which can be attached to and detached from the developing unit.

4. The toner cartridge according to claim 1 which is integrated with the developing unit.
5. The toner cartridge according to claim 1, wherein said detection windows are located at positions where the optical axis of a light beam input and output through the detection windows passes over the developer exhaust port.
6. The toner cartridge according to claim 1 which can be attached to and detached from an image forming apparatus.
7. The toner cartridge according to claim 1, wherein the intersection angle between the optical axis of said light beam and the rotary shaft of said rotary conveyance body is in the range of about  $\pm 30^\circ$  of an angle  $\theta$  calculated from the following expression:
$$\tan\theta = (\text{diameter of rotary conveyance body}) / (\text{length of rotary shaft}).$$
8. The toner cartridge according to claim 1, wherein the developer detector for projecting and receiving said light beam is provided in the developing unit.
9. The toner cartridge according to claim 1, wherein the

developer detector for projecting and receiving said light beam is provided in an image forming apparatus.

10. A toner cartridge comprising:

a developer storage container for storing a developer;  
a rotary conveyance body, arranged in said developer storage container, for carrying a developer in the storage container toward an exhaust port; and

detection windows through which a light beam projected from a developer detector is input and output to detect the remaining state of the developer in the toner cartridge when the toner cartridge is mounted to a developing unit, wherein  
said detection windows are arranged such that the optical axis of the input and output light beam becomes parallel to a direction that said rotary conveyance body carries the developer.

11. The toner cartridge according to claim 10 which can be attached to and detached from the developing unit.

12. The toner cartridge according to claim 10 which is integrated with the developing unit.

13. The toner cartridge according to claim 10, wherein said

detection windows are located at positions where the optical axis of a light beam input and output through the detection windows passes over the developer exhaust port.

14. The toner cartridge according to claim 10 which can be attached to and detached from an image forming apparatus.

15. An image forming apparatus comprising:

a toner cartridge for storing a developer, which comprises a rotary conveyance body for carrying the stored developer toward an exhaust port;

an image carrier having a latent image formed thereon and holding a developer image developed with the developer;

a developing unit for developing the latent image formed on the surface of the image carrier; and

a developer detector having a light beam projecting unit and a light beam receiving unit to detect the remaining state of the developer in said toner cartridge, wherein

said toner cartridge has detection windows through which a light beam projected from said developer detector is input and output when the toner cartridge is mounted to the developing unit; and

said detection windows are arranged at positions where the optical axis of the input and output light beam intersects

the rotary shaft of said rotary conveyance body obliquely on a projection plane when seen from the top or side of the toner cartridge.

16. The image forming apparatus according to claim 15, wherein the detection windows of said toner cartridge are arranged such that the optical axis of the input and output light beam becomes parallel to a direction that said rotary conveyance body carries the developer.

17. The image forming apparatus according to claim 15, wherein the detection windows of said toner cartridge are arranged at positions where the optical axis of a light beam input and output through the detection windows passes over the developer exhaust port.

18. The image forming apparatus according to claim 15, wherein said toner cartridge can be attached to and detached from the image forming apparatus.

19. An image forming apparatus comprising:  
a toner cartridge for storing a developer, which comprises a rotary conveyance body for carrying the stored developer toward an exhaust port;

an image carrier having a latent image formed on the surface and holding a developer image developed with the developer:

a developing unit for developing the latent image formed on the surface of the image carrier; and

a developer detector having a light beam projecting unit and a light beam receiving unit, for detecting the remaining state of the developer in said toner cartridge, wherein

said toner cartridge has detection windows through which a light beam projected from said developer detector is input and output when the toner cartridge is mounted to the developing unit; and

said detection windows are arranged such that the optical axis of the input and output light beam becomes parallel to a direction that said rotary conveyance body carries the developer on a projection plane when seen from the top or side of the toner cartridge.

20. The image forming apparatus according to claim 19, wherein the detection windows of said toner cartridge are arranged at positions where the optical axis of the input and output light beam passes over the developer exhaust port.

21. The image forming apparatus according to claim 19,

wherein said toner cartridge can be attached to and detached from the image forming apparatus.